UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 6TH AVENUE
SEATTLE, WASHINGTON 98101

DATE:	See date of Section Chief signature
SUBJECT:	CLEAN AIR ACT INSPECTION REPORT King County Cedar Hills Landfill, Maple Valley, WA
FROM:	Daniel Heins, Environmental Scientist Air Toxics Enforcement Section, EPA Region 10
THRU:	Derrick Terada, Acting Section Chief Air Toxics Enforcement Section, EPA Region 10
TO:	File

BASIC INFORMATION

Facility Name: King County Cedar Hills Regional Landfill
Facility Location: 16645 228th Ave SE, Maple Valley, WA 98038

Date of Inspection: On-Site Inspection: May 23, 2022
Virtual Conference: May 27, 2022

EPA Inspector(s):

1. Daniel Heins, Environmental Scientist [a,b]
2. Brendan Whyte, Air and TRI Compliance Officer [a,b]
3. Katrina (Katie) Bradshaw, Multi Media Inspector [b]

Other Attendees:

1. Rusty Bogart, Landfill Gas Technician – King County [b]
2. Dan Swope, Engineer – King County [a,b]
3. Laura Belt, Supervisory Engineer – King County [b]
4. Samantha Guthrie, Engineer – King County [a,b]
5. Jeff Dye, Landfill Gas Lead – King County [a,b]
6. Jennifer Keune, Environmental Compliance Coordinator – King County [a,b]
7. Scott Barden, Assistant Operations Manager – King County [a]
8. Rick Woodford, Inspector – Puget Sound Clear Air Agency (PSCAA) [b]
9. Nina Lawson, Inspector - PSCAA [b]

[a] Attended virtual conference
[b] Attended on-site inspection

Contact Email Address: Jennifer.Keune@kingcounty.gov

Purpose of Inspection: Surface emissions monitoring and general Clean Air Act compliance

Facility Type: Muncipal solid waste (MSW) landfill

Regulations Central to Inspection: 40 C.F.R. Part 60, Subpart WWW; 40 C.F.R. Part 60, Subpart XXX; 40 C.F.R. Part 63, Subpart AAAA

On Site (5/23) Arrival Time: 10:00
On Site (5/23) Departure Time: 13:15
Virtual Conference (5/27) Start Time: 11:30
Virtual Conference (5/27) End Time: 13:00

Inspection Type:
☐ Unannounced Inspection
☒ Announced Inspection

SITE OVERVIEW

The following information was obtained verbally from King County representatives during the virtual conference and on site inspection.

Operations Overview:
The Cedar Hills Landfill (the Landfill) is a publicly owned and operated municipal solid waste (MSW) landfill occupying approximately 460 acres. The Landfill has been in operation since the mid-1960s and is subdivided into a handful of areas that collectively occupy a contiguous area. The Southeast Pit and Main Hill (on the eastern side of the Landfill) are unlined units that pre-date RCRA regulations. All other units (Areas 2/3 through 8 and the Central Pit) have bottom liners with PVC and/or HDPE. Area 8 on the southwest end is the only area where waste is currently being placed. It began receiving waste in July 2019, and construction of the unit began in 2016. Area 8 has a capacity of 8 million tons.

The Landfill receives approximately 2800 tons of waste per day, over 90% of which is MSW from residential and commercial sources. The Landfill does not receive construction and demolition (C&D) waste, though it does receive some asbestos wastes and small amounts of industrial wastes. The Landfill does not handle refrigerants.

The Landfill has final cover in place over most units, constructed according to the specifications of WAC 173-304 & 351, depending on closure year. Under both provisions, this includes synthetic liners (HDPE and/or LLDPE) in addition to the soil and drainage layers. Intermediate cover is placed over areas set to receive more waste, and varies in construction by location on site. The south slope of Area 7 has a 40 millimeter (mm) LLDPE cover. The tops of Areas 5 and 6 have three feet of soil underlain by a scrim, and the north slope of 7 has a 40 mm liner in addition to its soil layer. Area 8 is the only place with daily cover currently, which is either tarps or soils. Compost overs/hog fuel were historically used as daily cover, but are not currently.

The gas collection and control system (GCCS) has 814 wells. Most wells are horizontal, with a layer of wells added each lift during filling. The Main Hill and Southeast Hill are primarily controlled by vertical collectors, with the system of horizontal collectors implemented for all newer areas. Area 7 has eight layers of horizontal wells. Over the course of filling Area 7, lateral spacing was reduced from 180 to 120 feet. Gas is collected from Area 8. The Landfill uses HDPE for horizontals rather than PVC, and they periodically run cameras through to check for blockage. Well collapse is not a common issue, though differential subsidence can cause water blockage. The Landfill typically relies on surrounding wells to ensure gas collection coverage though has installed vertical wells in wetter areas to compensate for flooded horizontal wells. In some areas, gas is collected from both sides of the horizontals to ensure adequate vacuum throughout.

Leachate is collected by gravity flow in most units, though Area 8 has pumps, and is routed to leachate lagoons on site with 12 million gallon capacity where it is aerated and pumped to a publicly owned treatment works (POTW) in Renton. In 2021 the Landfill collected 174 million gallons of leachate. The Landfill does not and is not permitted to recirculate leachate or add liquids. The GCCS has condensate knockouts that route to the leachate system. Vertical wells have pumps added as needed to de-water, horizontals do not have pumps.

The Landfill in 2021 collected on average 6500 standard cubic feet per minute (scfm), 6200 of which was routed to the associated renewable natural gas plant owned/operated by BioEnergy Washington (BEW). The Landfill has five blowers of 4000 scfm capacity, though it only needs to run three at a time. The Landfill has five enclosed flares to control gas when not routed to BEW. Enclosed Flares #1, 2, and 3 are rated for 4000 scfm, and #4 & 5 are rated for 3800 scfm. Only three flares are needed at a time with maximum collection, so flare outages/maintenance do not affect gas collection. The Landfill also has an open flare at 1000 scfm for the lower methane content gas collected primarily from the Main Hill and Southeast Hill.

SITE TOUR — MAY 2, 2022

☒ Presented Credentials
☒ Stated authority and purpose of inspection
☐ Provided Small Business Resource Information Sheet
☒ Small Business Resource Information Sheet not provided. Reason: Not a small business
☒ Provided CBI warning to facility

Data Collected and Observations:
EPA conducted an abbreviated SEM survey of the facility, focusing on Areas 5, 6, and 7 (the areas with most recent waste deposition subject to gas collection requirements). EPA used two ThermoFisher Toxic Vapor Analyzers 2020 (TVA2020) to perform EPA Reference Method 21 for the SEM. King County conducted their own readings with their own instruments. EPA made observations with a FLIR GF-320 Optical Gas Imaging camera. EPA observed that there were very few penetrations in the intermediate cover areas, which King County explained was due to the reliance on horizontal collectors for these areas.

EPA detected three points in exceedance of the 500 parts per million (ppm) surface methane standard. Two were at penetration points, and one was at a hole in the synthetic cover at the top of the slope on the south side of the hill overlooking Area 8.

EPA additionally walked over to the flare station. The candlestick flare handling lower methane content gas from older sections of the landfill was in operation. All other gas was routed to the BioEnergy Washington renewable natural gas facility.

Photos and/or Videos: were taken during the inspection. See Appendix A.
Field Measurements: were taken during this inspection. See Appendix B.

INSPECTION CONFERENCE — MAY 27, 2022

☒ Provided U.S. EPA point of contact to the facility
☒ Provided CBI warning to facility

Staff Interview:
Area 8 triggered the switch from NSPS Subpart WWW to Subpart XXX, though King County stated they will need to follow up with the details of the updated Design Plan. King County also stated that they would need to look into whether they were following the monitoring provisions in Subpart XXX or had opted in to the provisions of Subpart AAAA. King County noted that their current Title V permit was issued in 2001 and that they have been waiting on a renewal application submitted to Puget Sound Clean Air Agency (PSCAA) in 2005. PSCAA has issued them Construction Permits for expansions and changes since 2001.

The Landfill performs monthly checks at gas migration probes. These are primarily located at the fenceline, with some interior "performance probes" located inside the property but outside the waste. Concentrations above 1% typically result in some attempt at resolution, such as addition of wells. One performance probe with high readings was added as a gas collector.

Surface emissions monitoring is conducted in-house with two SEM5000 instruments. A TVA2020 is available as a backup. King County typically finds approximately three hits per quarter, usually at penetrations of liners, and corrective action involves digging to the liner and repairing the issue. King County will exclude active construction areas from monitoring, and potentially steep slopes pending weather. During dry weather, all slopes are monitored, including the bare liner on the south slope of Area 7.

The soil stockpile on top of Area 6 is 20-30 feet thick, with additional piles on top at greater thicknesses. The soil was trucked over when digging out Area 8.

Cover integrity is done monthly, with particular attention to dead vegetation and loose wellheads. Corrections are logged.

There are no higher operating values for wells currently, few wells get close to 131 degrees Fahrenheit. There was a subsurface oxidation issue on the Main Hill in one spot. King County

closed some wells around it and now the area is down to around 100 degrees F and has carbon monoxide readings down to single digit ppm.

The Landfill has received less than 10 odor complaints in 2022, in past years they have seen around 20. In response to complaints the gas crew investigates possible sources and checks on the daily cover.

EPA asked about a statement from BEW that gas collection volume had gone down over time and if King County knew why this was the case. BEW stated during that inspection that collected flows historically had been as high as 9800 scfm. King County stated that they are seeing if they can improve this by increasing vacuum and adding dewatering wells on Area 7, though they are not confident that the reduction is due to lower collection efficiency rather than lower gas production due to possible changes in landfill chemistry. Food waste started being diverted from the Landfill to compost during the filling of Area 7; yard waste has been diverted for longer.

Requested documents:
The following documents were requested and supplied ahead of the inspection:

- Two most recent semi-annual NSPS reports
- Results of the most recent cover integrity reports and quarterly SEM monitoring events if not in the final NSPS reports
- GCCS map
- Map of cover by type in place
- Well water level survey results (most recent)

The following documents were requested during the virtual conference and confirmed via follow up email:

- Most recent Title V permit and each construction permit since then
- Most recent performance test for each flare (both enclosed and open)
- 12 months of the 15-minute flare data for each flare (temps/flows for enclosed, flame check/flows for the open)
- 12 months of monthly wellhead monitoring data
- Most recent GCCS Design Plan pre-XXX and the current GCCS Design Plan

DIGITAL SIGNATURES

Heins, Daniel
Digitally signed by Heins, Daniel
Date: 2022.06.02 12:12:13 -07'00'

Daniel Heins, Report Author

DERRICK TERADA
Digitally signed by DERRICK TERADA
Date: 2022.06.03 09:42:55 -07'00'

Derrick Terada, Acting Section Chief

APPENDICES AND ATTACHMENTS

Appendix A: Digital Image Log

Appendix B: Field Measurement

APPENDIX A: DIGITAL IMAGE LOG

Inspector Name: Brendan Whyte (photos); Daniel Heins (FLIR video)
Archival Record Location: US EPA SharePoint

2022-05-22 Images/Videos

File Name	Time (PDT)	Description
P5190139.JPG	10:58	Piles of fill on top of hill
P5190140.JPG	11:19	Flag #1, penetration A5IS-3 in Area 5.
P5190141.JPG	11:25	Bacterial sheen on puddle
P5190142.JPG	11:53	Active area
P5190143.JPG	11:53	Active area
P5190144.JPG	11:53	Asbestos corridor (marked by cones)
P5190145.JPG	12:02	Flag #2, penetration A7IS-3 in Area 7
MOV_0658.mp4	12:15	[FLIR Video] Hole in geo membrane, exceedance #3
P5190146.JPG	12:17	Hole in geo membrane, exceedance #3
P5190147.JPG	12:53	"Low quality gas" flare
P5190148.JPG	12:53	Enclosed flares (5), inactive

APPENDIX B: FIELD MEASUREMENT DATA

Measured Exceedances

Flag #	Coordinates	EPA Reading (ppm)	Description/Notes
1	47.46265, -122.05013	722	Penetration in area 5 ("A5IS-3").
2	47.45948, -122.05074	647	Penetration in area 7 near top of synthetic cover ("A7IS-3").
3	47.45973, -122.04808	9,000 / Flameout	Hole in synthetic cover near top of Area 7 south slope

Calibration and Instrument Information

EPA used two ThermoFisher Toxic Vapor Analyzers 2020 (TVA2020), designated as TVA A95732 and SB7986. The EPA TVA2020 response times are approximately 4 to 5 seconds.

	Calibration gas ppm	A95732 ppm	SB7986
10:10 calibration check	500	497	490
10:10 calibration check	10000	1.02%	1.03%
13:00 drift check	500	493	471

EPA calibration gases

Composition	Lot #	Expiration
Air zero grade THC <1 ppm	DBJ-1-24	March 2023
Methane in air 500 ppm	1-167-64	June 2024
Methane in air 10,000 ppm	228894	February 2023

Background readings:

Upwind: 1.3 ppm

Downwind: 2.5 ppm